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Transformation of residual oil in producing formations of the Romashkino oil field during hydrothermal treatment

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Abstract

Changes in the composition of organic matter of rocks and residual oil from multiage deposits of the Romashkino oil field in a reducing environment in a continuous-flow aqueous system were studied. It was shown that, as a result of the action of hydrothermal factors, the amount of hydrocarbon fractions increases and the amounts of alcohol-benzene-extractable resins, asphaltenes, and total sulfur decrease in organic extracts obtained from the rocks after hydrothermal experiments. The concentration of free radicals, as well as tetravalent vanadium (which is present in the form of vanadyl prophyrin complexes) and other heavy metals, in asphaltenes decreases. The hydrothermal treatment of petroliferous rock leads to the degradation of the structure of insoluble kerogen and unrecoverable components of residual oil, as well as to the washout of free hydrocarbons from the rock with the aqueous phase, n-Alkanes; ethyl, butyl, and octyl phthalates; furan; acids; and unsaturated oxygen-containing compounds with the isoprenoid structure were detected in the products of hydrothermal experiments isolated from aqueous extracts.

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